



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,704	03/29/2005	Keiichi Nakao	043890-0727	2023

20277 7590 02/23/2007
MCDERMOTT WILL & EMERY LLP
600 13TH STREET, N.W.
WASHINGTON, DC 20005-3096

EXAMINER

HOANG, TU BA

ART UNIT	PAPER NUMBER
----------	--------------

2832

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/529,704

Applicant(s)

NAKAO ET AL.

Examiner

Tu Ba Hoang

Art Unit

2832

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) *
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) .
Paper No(s)/Mail Date 3/29/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ .
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

Art Unit: 2832

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/JP04/15980, filed on October 28, 2004.

Drawings

Figures 2A, 2C, 4A-4B, 5A-5D, and 7 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "closer" recited in claim 1 and claim 22 is a relative term which renders the claim indefinite. The term "closer" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear how much thermal expansion coefficient of the adjusting layer would be considered closer to the thermal expansion coefficient of the glass layer. Such thermal expansion coefficient must be clearly defined.

Since if consider "closer" were mean "the same", then there will be no thermal expansion coefficient difference between the strain-sensitive resistor and the adjusting layer, in which it would make the recitation of the difference in claim 6 indefinite. For examination purpose, the term "closer" has been interpreted as "less than, more than, or about".

Claims 7 and 12 are identical, one of them must be deleted. Claim 12 is also objected to under 37 CFR 1.75 as being a substantial duplicate of claim 7. Applicant is advised that should claim 7 or 12 be found allowable, claim 7 or 12 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

Art Unit: 2832

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-14, 16, 18, 22-26, and 30 as being best understood are rejected under 35 U.S.C. 102(b) as being anticipated by Ratell et al (US 5,867,886). Ratell et al shows all features of the claimed invention including a load sensor 18 (shown in Figure 3) comprising: a flexible metal substrate or diaphragm 26; a glass layer 28,38 (column 6, lines 5-11 and line 55, i.e., at least the dielectric layer 28 formed from the glass dielectric ink or film) provided on the substrate 26; an internal wiring contact or electrode 36 provided on the glass layer, 28,38; an adjusting layer 38 provided on the glass layer 28; and a strain-sensitive resistor element 34 (column 5, lines 66-67, i.e., allowed strains to be transmitted and column 6, line 65, i.e., in the form of the pattern) provided on the adjusting layer 38 and connected to the wiring 36, wherein a thermal expansion coefficient of the adjusting layer 38 is about the same to a thermal expansion coefficient of both the strain-sensitive resistor element 34 and the glass layer 28 (or equivalently, thermal expansion coefficient of the adjusting layer is closer to a thermal expansion coefficient of the strain-sensitive resistor element than a thermal expansion coefficient of the glass layer) as set forth at column 5, line 56 to column 6, line 10 (i.e., each thick film dielectric layer must withstand the strains induced as the substrate 26 deflects while transmits the strains (or thermal expansion coefficient) to the element 34 at a level proportional to the strain in the substrate 26 and provides the thermal expansion coefficient that approximately equals that of the substrate 26), wherein the glass layer 28 includes crystallized glass such as porcelain, quartz, SiO_2 (column 6, lines 13-14), as the thermal expansion coefficients are kept approximately the same among the layers 28,38,34, the difference in such thermal expansion coefficients between the layers 28,38,34 is almost zero or less than zero, where it meets the limitations of claims 4-7 (i.e., a difference between the thermal expansion coefficient of the substrate and the thermal expansion coefficient of the strain-sensitive resistor element is not less than $10 \times 10^{-7}/^\circ\text{C}$ and is less than $50 \times 10^{-7}/^\circ\text{C}$ (claim 4), or a difference between the thermal expansion coefficient of the substrate and the thermal expansion coefficient of the glass layer is less than $20 \times 10^{-7}/^\circ\text{C}$ (claim 5), or a difference between the thermal expansion coefficient of the strain-sensitive resistor element and the thermal expansion coefficient of the adjusting layer is less than $20 \times 10^{-7}/^\circ\text{C}$ (claim 6)), each of the strain-sensitive resistor element 34 and the adjusting layer 38 has a thickness which is not smaller than $1 \mu\text{m}$ and is smaller than $500 \mu\text{m}$ as set forth at column 5, lines 27-28 (i.e., each is about $25 \mu\text{m}$ which meets both claims 7 and 11-12), the adjusting layer 38 has an area which is not smaller than $0.1 \text{ mm} \times 0.1 \text{ mm}$ and is smaller than $50 \text{ mm} \times 50 \text{ mm}$ (column 5, lines 53-55, i.e., the same diameter with the substrate 26 which is of about 4 to about 20mm, where $20 \text{ mm} \times 20 \text{ mm}$ is clearly within the claimed range), wherein the adjusting layer 38 has an area larger than an area of the strain-sensitive resistor element 34 and the wiring contact 36.

Art Unit: 2832

includes a portion provided on the adjusting layer 38 as clearly shown in Figure 3, the glass layer has a thickness of about 25 μ m as set forth earlier at column 5, lines 27-28 which is within the recited range of not smaller than 10 μ m and is smaller than 500 μ m (meet claim 13). As shown in Figure 3, the resistor element 34 has an area which is at least smaller than the both the adjusting and glass layers 38, 28 where such area as early described at column 5, lines 53-55, is not smaller than 0.1 mm x 0.1 mm and is smaller than 50mm x 50 mm, in which it meet claim 14 (i.e., an area which is not smaller than 0.01mm² and is smaller than 2,500mm²), wherein the substrate 26 comprises metal plate die-cut with a mold to have a predetermined shape (such as a monolithic metal structure by either conventional stamping or machining techniques as set forth at column 4, lines 53-55, meet claim 16). Regarding the method claims 22-26 and 30, Ratell et al further shows the adjusting layer 38 can be formed by applying a glass paste onto the glass layer 28 and firing the applied glass pasted (column 6, lines 55-61), a protective layer or cap including connector 16 (as shown in Figure 1) is formed to cover the resistor element 34 and respective portions of the wiring electrodes 36, where the substrate 26 has a thickness not smaller than 1 mm (column 5, lines 52-53, meet claim 24). Regarding claims 25-26, Ratell et al further discloses at column 6, line 57 that the formed device including the resistor element 34 (which is formed by firing the resistor paste) and the glass layer 28, the adjusting layer 38 are fired at the temperature of about 850°C (i.e., firing the paste) which is within the recited range of not lower than 400°C and lower than 1000°C or ranging from 400°C to 900°C.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 2832

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 15, 17, 19-21, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ratell et al. Ratell et al discloses all features of the claimed invention as set forth above except for calling the thermal expansion coefficient of the metal substrate is within the range of $80 \times 10^{-7}/^{\circ}\text{C}$ to $200 \times 10^{-7}/^{\circ}\text{C}$ (as set forth in claim 15), the gauge factor of the resistor element is within 10 to 1,000 (as noted in claim 17), the adjusting layer comprises composite glass including 5wt% to 40wt% of ceramic filler which comprises ceramic powder having particle diameter within the range of 0.01 μm to 10 μm , the ceramic filler comprises at least one of alumina, zirconia, magnesia, titania, barium titanate, and calcia. Ratell et al discloses that the materials used to the adjusting layer and the glass layer would include aluminum oxide or alumina (column 2, lines 3-6 and column 6, lines 5-20) where suitable mixtures of metal oxides, ceramic materials, bonding agents, and ink compositions or possible commercially materials can be used as long when subjecting to firing, such materials will provide the thermal expansion coefficient the same among the layers. Depend upon the desired flexibility, adherence, withstanding strains or pressures applied to the metal substrate of the sensor, the thermal expansion coefficient of the metal substrate can be chosen differently, the resistor gauge can be chosen different for each desired strain, the wt% of the ceramic filler and its particle diameter can be chosen depend upon the desired thermal expansion and flexibility requirement. Inasmuch, such choices would be within the purview of obviousness to Ratell et al as well as to one having ordinary skill in the art at the time the invention was made.

Claims 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not suggest the use of a glass paste that comprises: dispersing ceramic powder in solvent and binder as to have a viscosity which is not smaller than 0.01 poises and is smaller than 100 poises; and dispersing glass powder in the solvent and the binder including the ceramic powder dispersed therein to have a viscosity which is not smaller than 100 poises and is smaller than 10,000 poises (as recited in claim 28) or dispersing ceramic powder in solvent and dispersant as to have a viscosity which is not smaller than 0.01 poises and is smaller than 100 poises; and dispersing glass powder in the solvent and the dispersant including the ceramic powder dispersed therein as to have a viscosity which is not smaller than 100 poises and is smaller than 10,000 poises (as recited in claim 29).

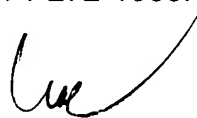
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Ellis (US 5,898,359), Zitzmann (US 6,543,102), and Nakao et al (US 7,164,342).

Art Unit: 2832

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu Ba Hoang whose telephone number is (571) 272-4780. The examiner can normally be reached on Mon-Thu from 6:00AM to 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Tu Ba Hoang
Primary Examiner
Art Unit 2832

February 15, 2007